

REMARKS

The Office Action mailed February 26, 2002, has been carefully considered.

In the Office Action, the Examiner rejected claims 1-8 under 35 U. S. C. §102 as being anticipated by U. S. Patent No. 5,963,664 to Kumar et al. (hereinafter "Kumar"). In addition, the Examiner rejected claims 9-12 under 35 U. S. C. §103 as being obvious over Kumar in view of U. S. Patent No. 5,130,794 to Ritchey (hereinafter "Ritchey"). No claims have been allowed.

By this Response, Applicants are amending independent claims 1 and 9 to more particularly point out and distinctly claim the invention. The amendments to claim 1 are intended to reduce any likelihood of confusion. In particular, Applicants are amending the first few lines of claim 1 to clarify that

(i) the *panoramic mosaic image pair* comprises left and right panoramic mosaic images for use in facilitating panoramic stereoscopic viewing of a scene, and

(ii) the claimed *system* comprises the left and right panoramic image generators.

In addition, the claim has been amended to clarify that the images from which the left and right panoramic mosaic images are generated are recorded at respective positions *relative to the scene*, and to describe the left and right panoramic image generators separately.

Claim 9 has been amended to correct an obvious grammatical error.

Other claims, depending from claim 1, have been amended to make minor grammatical changes.

In addition, new claims 13-15 have been added to depend, directly or indirectly, from claim 1. A new independent apparatus claim 16 has also been added. In addition, an independent method claim 20 has been added modeled on independent apparatus claim 16 and an independent method claim 23 has been added modeled on independent apparatus claim 9. Dependent claims have also been added for each of the new independent claims.

Applicant respectfully submits that the claims patently distinguish over the references. Claim 1 is directed to a system for generating a panoramic mosaic image pair, the panoramic mosaic image pair comprising left and right panoramic mosaic images that, when viewed contemporaneously by respective left and right eyes, facilitate panoramic stereoscopic viewing of a scene. The system comprises left and right panoramic image generators, each configured to generate the left and right panoramic mosaic images from a series of images corresponding to respective positions relative to the scene. Each of the images has a respective left and right image portion. The left panoramic image generator is configured to mosaic the left image portions from the images to form the left panoramic image. Similarly, the right panoramic image generator is configured to mosaic the right image portions from the images to form the right panoramic image.

Accordingly, the system recited in claim 1 generates two panoramic mosaic images, namely, *left and right* panoramic images, that, when a viewer views them contemporaneously with his or her respective left and right eyes, facilitate panoramic stereoscopic viewing of the scene.

Kumar describes a system for generating a three-dimensional mosaic of a scene using a plurality of images of the scene. In Kumar's system, information from the images are used to generate two mosaics, including what appears to be a image mosaic representing a panoramic view of the scene and a shape mosaic representing the three-dimensional geometry of the scene. The image mosaic appears to be a conventional two-dimensional mosaic derived from a series of images of the scene that overlap somewhat along their edges to facilitate mosaicing them together. For the three-dimensional shape mosaic, a pair of images are used, one of which is referred to as a reference image and the other as an inspection image. Both images are used to simulate a parametric reference surface in the portion of the scene that appears in both images. In addition, both images are used to generate a parallax displacement field for the portion of the scene that appears in both images. The parallax displacement field comprises a plurality of parallax displacement vectors in the reference image. Each parallax displacement vector is associated with a point on the surface of an object in the scene and the magnitude and direction corresponds to the displacement of the point P (referring to Kumar FIG. 3) in the scene from the point Q on the parametric reference surface that corresponds to the projection of the point P onto the parametric reference surface along the line from the optical center M of the camera that recorded the inspection image. After the parametric reference surface

and parallax displacement field have been generated, the three-dimensional shape mosaic is generated.

Applicants respectfully submit that claim 1 patentably distinguishes over Kumar. In particular, although Kumar describes a system for generating two mosaics, the mosaics are very different from those generated by the arrangement recited in claim 1. In the arrangement recited in claim 1, the mosaics are left and right panoramic images of a panoramic mosaic image pair that, when viewed contemporaneously by respective left and right eyes, facilitate panoramic stereoscopic viewing of a scene. The mosaics generated by Kumar's system comprise one conventional two-dimensional image mosaic and a three-dimensional mosaic, and there is no suggestion that they are to be viewed contemporaneously by respective eyes of a viewer or that, if they were, that would facilitate panoramic *stereoscopic* viewing of the scene. Accordingly, Applicants respectfully submit that Kumar neither teaches nor suggests the invention recited in claim 1.

Claim 9 is directed to a system for displaying a stereo panoramic image to a viewer. The system is recited comprising respective left and right display elements each configured to display left and right panoramic images of a scene to said viewer such that one of said images is viewed by each of said viewer's eyes.

Applicants respectfully submit that claim 9 patentably distinguishes over Kumar and Ritchey, whether considered individually or in combination. Kumar does not describe a system for displaying images to a viewer, as the Examiner recognizes. The Examiner cites Ritchey as describing a system for displaying an image to a viewer, but it does not teach displaying multiple images, in particular "left and right panoramic images" referred to in the claim, and relies on Kumar for teaching that feature. However, as described above, Kumar in fact does not teach the "left and right panoramic images" feature of the claim, but teaches a system for generating very different types of mosaic images. Accordingly, Applicants respectfully submit that Kumar and Ritchey neither teach nor suggest the invention recited in claim 9, whether considered individually or in combination.

New apparatus claim 16 is directed to a system for generating a panoramic mosaic image of a scene from a series of images of the scene recorded at a corresponding series of positions relative to the scene. The system recited in claim 16 comprises a strip selector and a mosaic image

generator. The strip selector is configured to select, from each of said images, a strip, all of the strips being displaced from a selected one of said sides of an axis of the image by a selected amount. The mosaic image generator is configured to mosaic the strips selected by the strip selector from the successive images together thereby to construct the panoramic mosaic image.

It will be appreciated that claim 16 is directed to a system that can generate one of the left or right panoramic images of a panoramic mosaic image set. As shown, for example, in FIG. 4 of this application, the left panoramic image is formed from strips displaced to one side of the center axes of the images (the center axis corresponds to the vertical center of strips 30(C)(n)), and the right panoramic image is formed from strips displaced to the other side of the center axes of the images. As explained in connection with FIGS. 1A, 1B and 3, by selecting the strips from which each panoramic image is constructed in this way, the image can depict points in a scene as viewed by one of a viewer's eyes. Thus, if strips displaced from both sides of the center are used to construct respective panoramic images, and if a viewer views the panoramic images viewed contemporaneously, with each eye viewing one of the images, the viewer will view the scene stereoscopically.

Applicants respectfully submit that claim 16 patentably distinguishes over the references. For example, although Kumar does teach constructing an image mosaic from input images (see Kumar's FIG. 2), there is no suggestion of constructing it from strips displaced to one side of an axis by a selected amount. Applicants have reviewed the other references and submit that they also do not teach this feature. Accordingly, Applicants respectfully submit that the references neither teach nor suggest the invention recited in claim 16.

New independent method claim 20 recites a method along the lines of that performed by the apparatus recited in new claim 16. Applicants respectfully submit that claim 20 is allowable for the reasons set forth above in connection with claim 16.

New independent method claim 24 recites a method along the lines of that performed by the apparatus recited in claim 9. Applicants respectfully submit that claim 24 is allowable for the reasons set forth above in connection with claim 9.

In addition, Applicants respectfully submit that the dependent claims are allowable at least for the reason that they depend from allowable independent claims.

It is believed that this application is allowable, and a notice of allowability is respectfully solicited.

Respectfully submitted,



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